

AMENDMENTS TO THE CLAIMS

The listing of claims provided below will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Previously presented) A device for mass deacidification, elimination of free acidity and disinfection of cellulosic materials comprising an autoclave with pressure and temperature control, and capable of receiving the cellulosic materials to be treated; a solvent bottle fluidly connected to the autoclave; a first loading cell receiving the solvent bottle and programmed to determine the amount of solvent for each process; a dosification tank in fluid communication with the autoclave containing a concentrated reagent capable of introducing the correct amount of reagent depending on the weight of the material to be treated; and a tank for gravity collection of the residual solution arriving from the autoclave for its subsequent recovery wherein the residual solution collection tank has a heating system for heating to distill the solvent contained in the residual solution.

2-63 (Cancelled)

64. (Previously Presented) The device of claim 1 wherein the residual solution collection tank has a refrigeration system used during emptying of autoclave.
65. (Previously Presented) The device of claim 1, wherein the connection between autoclave and the residual solution collection tank can be opened and closed by a manual or an automatic valve.
66. (Cancelled)
67. (Previously Presented) The device of claim 1, wherein the solvent bottle has an external refrigeration system or a heating system.
68. (Previously presented) The device of claim 67, wherein the solvent bottle has a refrigeration system comprising a hermetic compressor, a condenser and a refrigerating jacket which envelopes the top part of solvent bottle.

69. (Currently amended) The device of claim [[1]] 67, wherein the device has a heat exchanger connected to the solvent bottle and the residual solution collection tank which optimizes the refrigeration of the solvent bottle and uses the heat generated to heat the residual solution collection tank.
70. (Previously Presented) The device of claim 1, wherein the residual solution collection tank has an inlet for a cleaning fluid, selected from the group consisting of anhydrous n-propanol, and air.
71. (Previously Presented) The device of claim 70, wherein the residual solution collection tank has an evacuation valve for the suspension formed after the distillation process.
72. (Previously presented) The device of claim 1, wherein a vacuum pump is connected to the autoclave.
73. (Previously presented) The device of claim 1, wherein the device has a second loading cell on which is placed the dosification tank of concentrated reagent.
74. (Previously presented) The device of claim 1, wherein the device has a programmable robot for controlling the processes of the unit automatically.
75. (Previously Presented) The device of claim 74, wherein the device has a touch screen from which the type and stages of the process may be selected according to the amount of material to be treated.
76. (Previously presented) The device of claim 75, wherein the device has a series of pneumatic valves NV1, NV2, NV3, NV4, NV5, NV6, NV7, and NV8 controlled by the robot and activated by the touch screen connected to the robot.
77. (Previously presented) The device of claim 76, wherein the device has a set of electro-valves EV1 and EV2 which open or close passage in several stages of the process.
78. (Previously presented) The device of claim 1, wherein the device has a series of manual valves VM1, VM2, VM3, VM4, VM5, VM6, VM7, VM8, VM9, and VM10 related to maintenance, replacing liquids or inlet of reagents and solvent.
79. (Previously presented) The device of claim 1, wherein the device has a recharging bottle connected to the system for recharging the solvent bottle according to the losses caused during the process.
80. (Previously presented) The device of claim 1, wherein the autoclave has a lid with a hermetic seal, a pressure gauge, a safety valve, a temperature control thermocouple inside

the autoclave, a pressure and vacuum measurement system, an external temperature control gauge and heating bands on the outside wall of autoclave.

81. (Previously Presented) The device of claim 1, wherein the device has as safety measures a safety valve in the upper section of the solvent bottle and a safety valve in the upper part of residual solution collection tank.
82. (Previously Presented) The device of claim 1, wherein the device has a filter indicating humidity absorption in a connection duct between the solvent bottle to the autoclave.
83. (Previously presented) The device of claim 68, wherein the device has a de-icing system to eliminate frost on the jacket covering the solvent bottle which forms during the distillation process, comprising a fan driven by a motor and a heating resistance.
84. (Previously Presented) The device of claim 83, wherein the device has a valve in said jacket for automatic outlet of condensates.
85. (Previously presented) The device of claim 1, wherein the dosification tank of concentrated reagent is connected to the autoclave so that the correct amount of concentrated reagent passes directly to the autoclave where the final desired concentration will be later obtained by direct conduction of solvent from the solvent bottle to the inner chamber of the autoclave.
86. (Previously presented) The device of claim 85, wherein the autoclave has an inlet for solvent and concentrated reagent which is alternately connected to the dosification tank of concentrated reagent or to the pure solvent bottle.
87. (Previously presented) A method of treating a cellulose-containing material comprising, in an autoclave:
 - exposing a cellulose-containing material to at least one cycle of oscillating pressure comprising
 - exposing the cellulose-containing material to atmospheric pressure and
 - exposing the cellulose-containing material to a vacuum;
 - conveying a deacidifying amount of a deacidifying agent and a carrier into the autoclave under a vacuum; and
 - impregnating said cellulose-containing material with said mixture and wherein the carrier comprises HCF 227, n-propanol , or both and further comprising conveying a remaining mixture arriving from the autoclave to a residual solution tank;

distilling the collected remaining mixture within the residual solution tank; and
conveying a vapor to a solvent bottle.

88. (Previously Presented) The method of claim 87, wherein the number of oscillating pressure cycles is from about 10 to about 50.
89. (Previously Presented) The method of claim 87, wherein the number of oscillating pressure cycles is sufficient to reduce the water content of the cellulose-containing material to less than about 2.5% by weight.
90. (Previously Presented) The method of claim 89, wherein the cellulose-containing material has a water content from about 2% to about 2.5% by weight.
91. (Previously Presented) The method of claim 87, wherein vacuum has a pressure from about 30 millibars to about 40 millibars.
92. (Previously Presented) The method of claim 87, wherein a temperature in the autoclave is less than about 50° C.
93. (Previously Presented) The method of claim 87, wherein a constant temperature is maintained in the autoclave.
94. (Previously Presented) The method of claim 87, wherein the deacidifying agent is conveyed into the autoclave by the autoclave vacuum.
95. (Previously Presented) The method of claim 87, wherein the carrier is conveyed into the autoclave before the deacidifying agent is conveyed into the autoclave.
96. (Previously Presented) The method of claim 87, wherein the deacidifying agent is a carbonate of magnesium di-n-propylate.
97. (Previously Presented) The method of claim 87, wherein the amounts of deacidifying agent and carrier conveyed into the autoclave are metered to achieve a predetermined concentration of deacidifying agent.
98. (Cancelled)
99. (Previously Presented) The method of claim 87, wherein the capacity of the autoclave is about 80 liters, the number of oscillating pressure cycles is between about 10 and about 50, the duration of each oscillating pressure cycle is about 8 minutes, and the mass of the cellulose-containing material is from about 20 kg to about 60 kg.
100. (Previously Presented) The method of claim 87 further comprising
conveying a metered amount of deacidifying agent to a premixing chamber;

conveying a metered amount of carrier to a premixing chamber; and
mixing said deacidifying agent and carrier

wherein the contents of the premixing chamber are not conveyed into the autoclave until
mixing is substantially complete.

101. (Previously Presented) The method of claim 100, wherein the deacidifying agent conveyed to the premixing chamber is in solution at a concentration of from about 50% to about 70% by weight.
102. (Previously Presented) The method of claim 100, wherein the carrier conveyed to the premixing chamber is preheated.
103. (Previously Presented) The method of claim 100, wherein the deacidifying agent in the mixture prior to conveyance into the autoclave has a concentration from about 2.0% to about 4.5% by weight.
104. (Previously Presented) The method of claim 87, wherein a duration of impregnation is about three hours.
105. (Cancelled)
106. (Previously presented) The method of claim 87, wherein the remaining mixture is conveyed to the residual solution tank by gravity, heat, or both gravity and heat.
107. (Previously presented) The method of claim 87 further comprising condensing the vapor to form a distillate.
108. (Previously Presented) The method of claim 107, wherein condensation of the vapor occurs in the solvent bottle.
109. (Previously Presented) The method of claim 108, wherein the solvent bottle has a temperature of less than about 25°C.
110. (Previously presented) The method of claim 87 further comprising removing the cellulose-containing material from the autoclave during distillation.
111. (Previously Presented) The method of claim 110 further comprising exposing in said autoclave a second cellulose-containing material to at least one cycle of oscillating pressure comprising
exposing the cellulose-containing material to atmospheric pressure and
exposing the cellulose-containing material to a vacuum;
during the distillation.

112. (Previously Presented) The method of claim 87 further comprising exposing the cellulose-containing material to an atmosphere substantially free of oxygen.
113. (Previously Presented) The method of claim 112, wherein the atmosphere substantially free of oxygen comprises nitrogen, carbon dioxide, HCF 227 or combinations thereof.
114. (Previously Presented) The method of claim 112, wherein the atmosphere substantially free of oxygen in the autoclave has a pressure from about 30 millibars to about 2 bars.
115. (Previously Presented) The method of claim 112, wherein a duration of exposure to the atmosphere substantially free of oxygen is sufficient to kill substantially all insects and/or insect larvae.
116. (Previously Presented) The method of claim 112, wherein a duration of exposure to the atmosphere substantially free of oxygen is from about 4 hours to about 6 hours.
117. (Previously Presented) The method of claim 87, wherein the method is automated.
118. (Previously Presented) The method of claim 100, wherein the method is automated.
119. (Previously Presented) The method of claim 87, wherein the method is automated.
120. (Previously Presented) The method of claim 111, wherein the method is automated.
121. (Previously Presented) The method of claim 87 further comprising a results control stage at the end of the process.
122. (Previously Presented) The method of claim 121, wherein the results control stage comprises
determining the magnesium distribution in the treated material before and after
treatment by means of a scanning electron microscope (SEM), and by identification
and quantitative determination by scanning with an electronic microprobe and
determination of the pH with a plane electrode in several parts of the pages selected
by random sampling.
123. (Previously Presented) The method of claim 122 further comprising making transverse
cuts in the cellulose-containing material in order to observe the distribution of magnesium
particles along the incision.
124. (Previously presented) A method of treating cellulose-containing materials comprising:
in an autoclave, exposing a first cellulose-containing material to at least one cycle of
oscillating pressure comprising
exposing the first cellulose-containing material to atmospheric pressure and

exposing the first cellulose-containing material to a vacuum;
conveying a metered amount of deacidifying agent to a premixing chamber;
conveying a metered amount of carrier to a premixing chamber;
mixing said deacidifying agent and carrier in the premixing chamber;
conveying a deacidifying amount of a deacidifying agent and a carrier into the
autoclave under a vacuum;
impregnating said first cellulose-containing material with said mixture.
conveying remaining mixture to a residual solution tank;
distilling the collected remaining mixture to produce a distillate;
conveying the distillate to a solvent bottle;
removing the first cellulose-containing material from the autoclave during said
distillation; and
exposing a second cellulose-containing material, during distillation, to at least one cycle
of oscillating pressure comprising
exposing the second cellulose-containing material to atmospheric pressure and
exposing the second cellulose-containing material to a vacuum.

125. (Previously presented) A method of treating cellulose-containing materials comprising:
in an autoclave, exposing a first cellulose-containing material to at least one cycle of
oscillating pressure comprising
exposing the first cellulose-containing material to atmospheric pressure and
exposing the first cellulose-containing material to a vacuum;
conveying a metered amount of deacidifying agent and a metered amount of carrier into
the autoclave wherein the deacidifying agent is conveyed into the autoclave at the
same time as or after the carrier is conveyed into the autoclave;
impregnating said first cellulose-containing material with said mixture.
conveying remaining mixture to a residual solution tank;
distilling the collected remaining mixture to produce a distillate;
conveying the distillate to a solvent bottle;
removing the first cellulose-containing material from the autoclave during said
distillation; and

exposing a second cellulose-containing material, during distillation, to at least one cycle
of oscillating pressure comprising
exposing the second cellulose-containing material to atmospheric pressure and
exposing the second cellulose-containing material to a vacuum.